

ABSTRACT

A hydrodynamic face seal **100** for sealing between the cylinder head **300** and rotating sleeve **200** of a rotating liner engine. The face of the face seal provides a sealing zone **130** for maintaining a lubricant layer of about 2 micrometers between the face seal and the sleeve; and a loading zone **132**. The loading zone includes hydrodynamic lift features such as inclined pads **150** or recessed step pads **152**. Oil is supplied to annular oil supply passage **142** between the sealing zone and the loading zone, and flows from the annular oil supply passage to radial passages **144** located between the step pads. A spring pre-load is provided to the seal. An outer secondary seal **190** is provided to contain the lubricant. One or more inner secondary seals is provided to contain lubricant and combustion gases. Spiral oil pumping grooves may be provided.